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**MA 1: Bio- and Molecular Magnetism**

Time: Monday 10:15–10:45

Location: H10

**Invited Talk**

MA 1.1 Mon 10:15 H10

**The magnetic compass of migratory birds: from behaviour to molecules and cognition** — •HENRIK MOURITSEN — IBU, University of Oldenburg, Oldenburg, Germany

Migratory birds can use a magnetic compass to find their way, but how do they sense the reference direction provided by the geomagnetic field? Two biophysical mechanisms have become established as the most promising candidates: (1) iron-mineral-based sensors in the upper beak connecting to the brain through the ophthalmic branch of the trigeminal nerve and/or (2) light-dependent radical-pair processes in the eyes converting the magnetic signal into a visual signal, which is then processed in visual brain areas. In my talk, I will introduce the two hypotheses. Then, I will present our most recent findings strongly

suggesting that the magnetic compass of night-migratory songbirds is part of the birds' visual system. This conclusion is based on a number of combined experiments involving molecular biology, anatomy, chemical analyses, neurobiology and behaviour. For instance, we have shown that potentially magnetosensitive molecules called cryptochromes are found in highly active neurons of the retina of night-migratory birds and that these cryptochromes possess a number of key biophysical prerequisites that makes them ideally suited as magnetodetectors. We have also located a specific forebrain area, named Cluster N, which we have demonstrated to be needed for magnetic compass orientation. In contrast, information transmitted through the ophthalmic branch of the trigeminal nerve is neither necessary nor sufficient for magnetic compass orientation in European Robins, a migratory bird.